Development of High Yielding Turf-type Kentucky Bluegrass Varieties for Non-burn Seed Production

W. J. Johnston

DOE ABPRTF Meeting
June 27, 2006

R. C. Johnson and C. T. Golob
Grower and University cooperators

Phase I

Diversity evaluation of USDA-ARS Kentucky bluegrass collection

Evaluation of Kentucky Bluegrass Germplasm

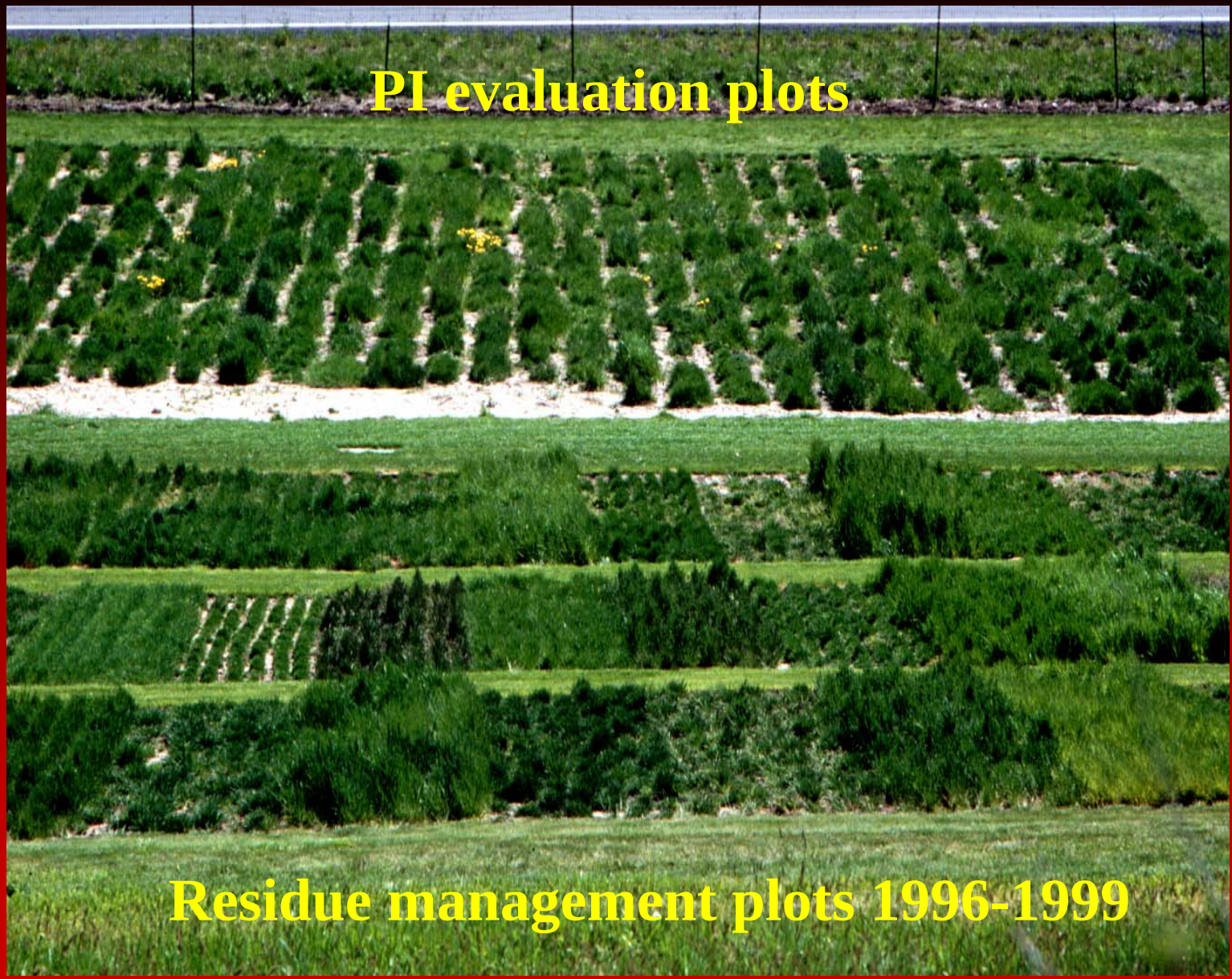
1994-1995

From the Western Regional Plant Introduction Station

- 228 PI accessions
- 17 Commercial cultivar checks

Developed a “Core Collection”

- Ward’s cluster analysis
- Identified 20 accessions representing the genetic diversity within the entire Kentucky bluegrass collection
- 16 additional PI accessions plus 9 commercial checks were established in residue management plots
- The 9 checks represented the 9 groups (types) of turf-type Kentucky bluegrasses


PI evaluation plots
Residue management plots 1996-1999

Seed production plot treatments: Burned, Baled, and Full Residue across bluegrass Accessions and Controls

Results:

Effect of residue management on seed yield compared to open-field burning

- **Open-field burning – 100% seed yield**
- **Residue removed (baled) – 63% of OFB**
- **Residue retained – 27% of OFB**

As expected,

Turf Quality was negatively correlated with Seed Yield

However,

Some accessions had seed yield and turf quality as high, or higher, than checks

Bluegrass	Turf Quality (1-9; 9=excellent)	Burned Yield (lbs/acre)	Baled Yield (lbs/acre)	Residue Retained Yield (lbs/acre)
PI230132	5.2	1464	1073	495
PI368241	5.0	1234	1146	508
PI539059	5.3	797	761	453
Kenblue	5.3	708	580	301
PI349188	5.9	662	559	322
PI371775	6.0	463	415	215
Midnight	7.2	372	393	208
PI372742	5.4	237	195	142
PI371768	6.6	190	214	131
PI574523	6.6	74	121	23

Phase III

Selection within accessions for diversity in seed yield components

Nursery for individual plant agronomic and molecular characterization

2002 -2004

10 entries (8 PI and 2 checks); 28 plants per entry; 3 replications

Agronomic variation within accessions

Variation for plant height within PI 349188

Selection for yield components: for each entry, 100 seed were obtained from 5 selected plants:

A. plant with highest yield
B. plant with high seed weight
C. plant with high seed per panicle
D. plant with high panicles per unit area

Also:
F. 100 seed from the original population

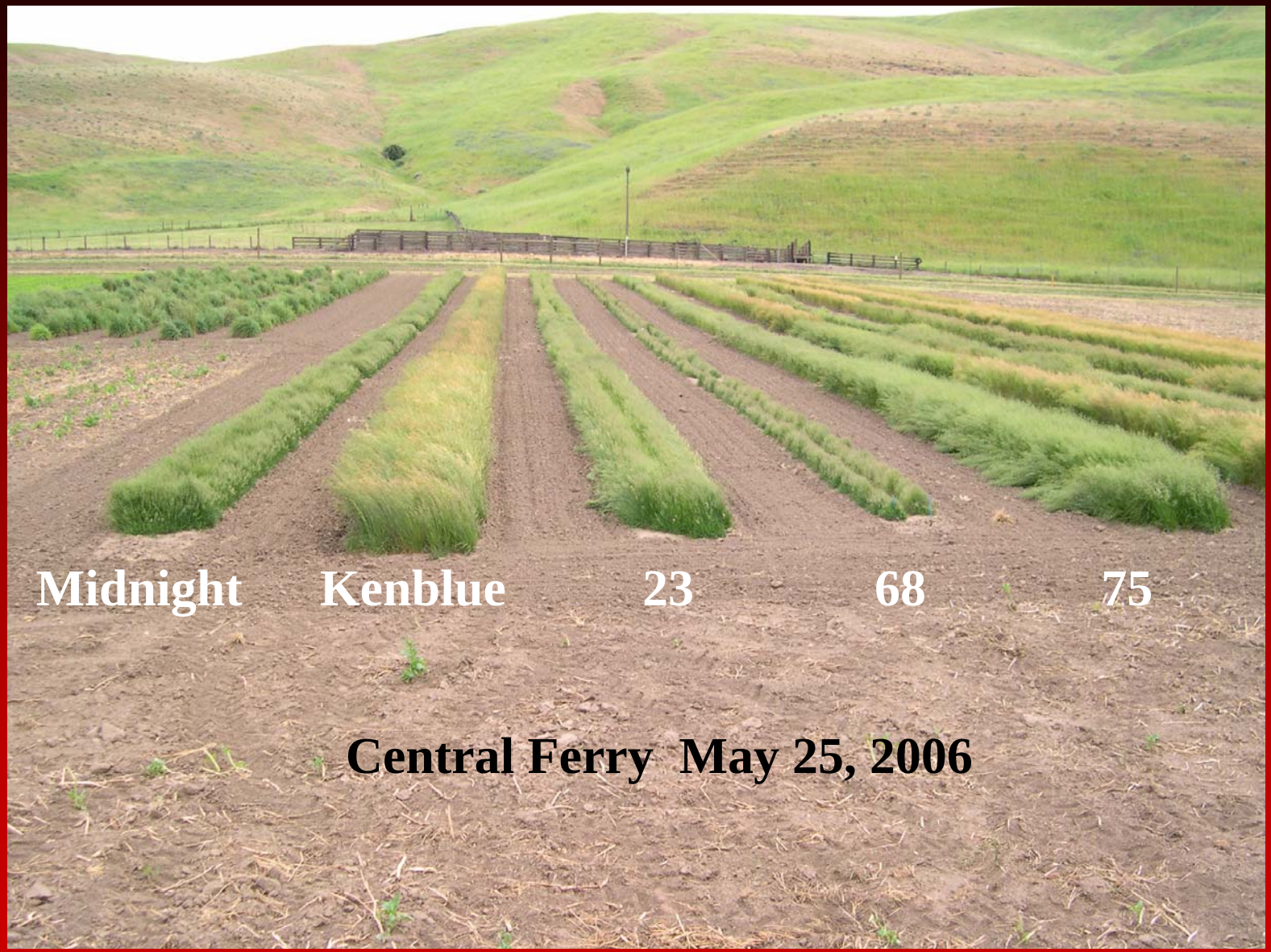
TOTAL = 5,000 plants
(10 entries, 5 selections, 100 seed)

Phase IV

Seed increase for on-farm seed yield trials and university turf trials

Grow out of bluegrass seedlings in flats


5,000 space plants established at the USDA research site at Central Ferry, WA


Midnight
Kenblue
23
68
75
Central Ferry May 25, 2006


41
32
Central Ferry
June 1, 2006

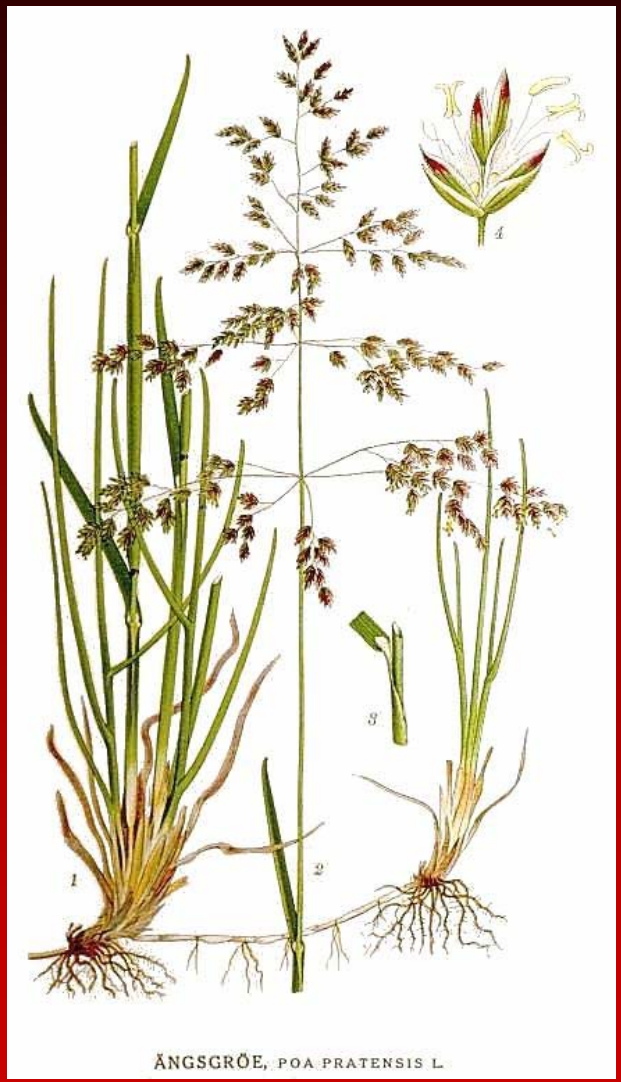
Central Ferry First Harvest June 1, 2006

2006 data collected

- Bloom date
- Harvest date
- Head height
- Leaf texture
- Leaf color
- Uniformity of heads

2006 data to do

- Seed yield
- Seed weight



Phase V

On-farm seed yield trials and turfgrass trials

On-farm Seed Production Plots

Currently:
10 selections x
5 parameters x
3 replications
= 150 plots
per location

Washington State University

Grass Seed Production Research